

**Water Body/Assessment Unit: Wilson Lake and the Wilson Lake Watershed  
including Paradise Creek and Saline River (Russell)  
Water Quality Impairment: Chloride**

**Subbasin:** Upper Saline

**Counties:** Ellis, Ellsworth, Gove, Graham, Lincoln, Logan, Osborne, Rooks, Russell, Sheridan, Thomas, Trego

**HUC 8:** 10260009      **HUC 11 (14):** **010** (010, 020, 030, 040, 050, 060, 070) (Figure 1)  
**020** (010, 020, 030, 040, 050, 060, 070, 080)  
**030** (010, 020, 030, 040, 050, 060, 070, 080)  
**040** (010, 020, 030, 040, 050)  
**050** (010, 020, 030, 040, 050)  
**060** (010, 020, 030, 040, 050, 060)  
**070** (010, 020, 030, 040)

**Ecoregion:** Western High Plains, Flat to Rolling Cropland (25d)  
Central Great Plains, Smoky Hills (27a)  
Central Great Plains, Rolling Plains and Breaks (27b)

**Drainage Area:** Approximately 1,900 square miles.

**Wilson Lake**

**Conservation Pool:** Area = 8,293 acres  
Watershed Area: Lake Surface Area = 147:1  
Maximum Depth = 18 meters (59 feet)  
Mean Depth = 7.4 meters (24 feet)  
Retention Time = 1.9 years (23 months)

**Designated Uses:** Primary and Secondary Contact Recreation; Expected Aquatic Life Support; Food Procurement

**Authority:** Federal (U.S. Army Corps of Engineers) and State (Kansas Dept. of Wildlife and Parks)

**2002 303(d) Listing:** Smoky Hill/Saline River Basin Lakes

## **Wilson Lake Watershed**

**Main Stem Segment:** WQLS: (4), 8, and 9-part (Saline River) starting at Wilson Lake and traveling upstream to east of the confluence with Spring Creek, East.

### **Main Stem Segments with Tributaries by HUC 8 and Watershed/Station Number:**

**HUC8: 10260009**

**Watershed: Wilson Lake (014001)**

Saline R (4)

Cedar Cr (30)

**HUC8: 10260009**

**Watershed: Paradise Creek (538)**

Paradise Cr (5)

Eagle Cr (6)

Paradise Cr (7)

**HUC8: 10260009**

**Watershed: Saline R. (Russell) (011)**

Saline R (8)

Salt Cr (20)

Saline R (9-part)

Sweetwater Cr (29)

**Designated Uses:** Primary and Secondary Contact Recreation; Expected Aquatic Life Support; Drinking Water; Food Procurement; Groundwater Recharge, Industrial Water Supply, Irrigation; Livestock Watering on Main Stem Segments

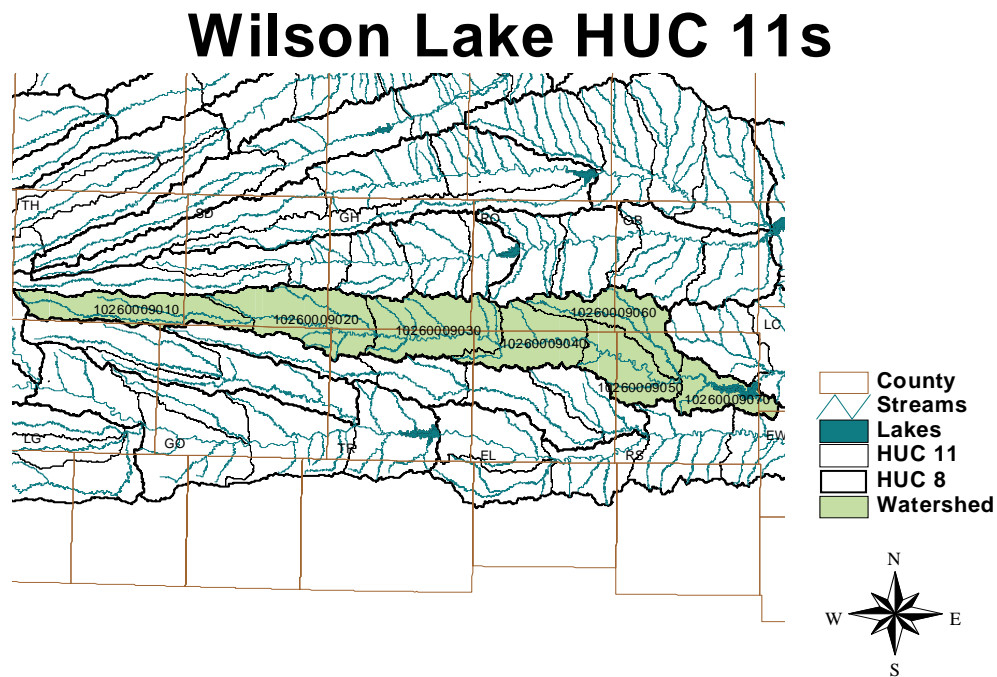
**2002 303(d) Listing:** Wilson Watershed Streams

**Impaired Use:** Domestic Water Supply (Potentially)

**Water Quality Standard:** Domestic Water Supply: 250 mg/L at any point of domestic water supply diversion (K.A.R.28-16-28e(c) (3) (A))

In stream segments where background concentrations of naturally occurring substances, including chlorides and sulfates, exceed the domestic water supply criteria listed in table 1a in subsection (d), at ambient flow, due to intrusion of mineralized groundwater, the existing water quality shall be maintained, and the newly established numeric criteria for domestic water supply shall be the background concentration, as defined in K.A.R. 28-16-28b(e). Background concentrations shall be established using the methods outlined in the “Kansas implementation procedures: surface water quality standards,” as defined in K.A.R. 28-16-28b(ee), available upon request from the department. (K.A.R. 28-16-28e(c) (3)(B))

Figure 1



2.

## CURRENT WATER QUALITY CONDITION AND DESIRED ENDPOINT

C

**Lake Monitoring Site:** Station 014001 in Wilson Lake (Figure 2).

**Period of Record Used:** Six surveys during 1988 - 2003

**Elevation Record:** Wilson Lake near Wilson, KS (USGS Gage 06868100)

**Stream Chemistry Monitoring Site:** Station 011 near Russell (Saline River)

**Period of Record Used:** 1990 - 2003

**Flow Record:** Saline River near Russell, KS (USGS Gage 06867000)

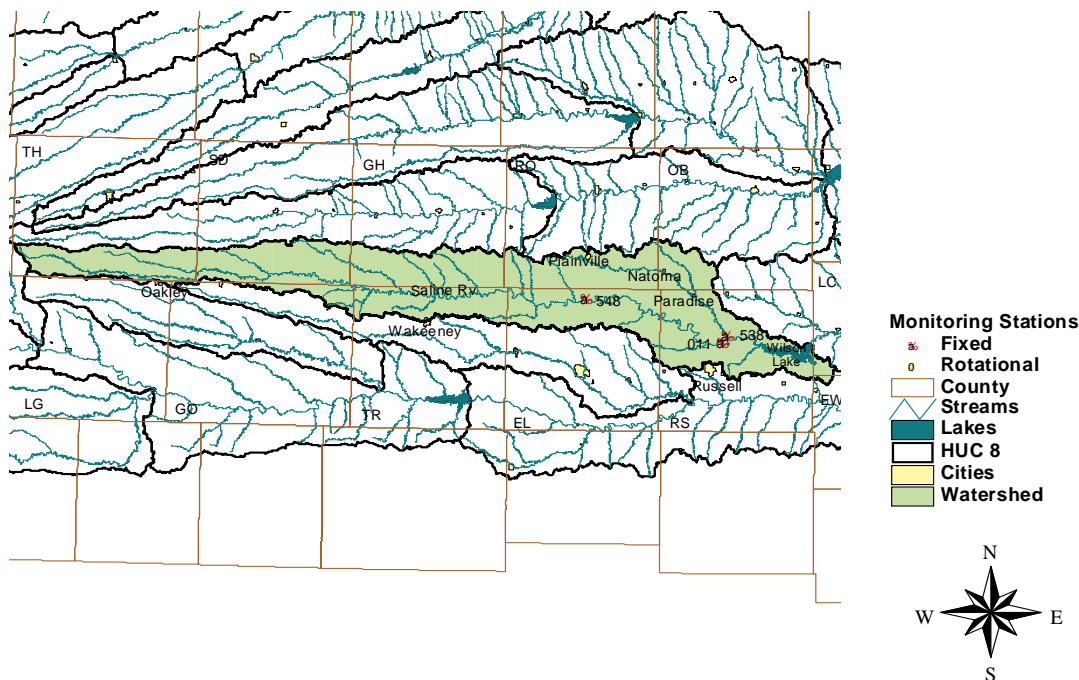
**Stream Chemistry Monitoring Site:** Station 538 near Waldo (Paradise Creek)

**Period of Record Used:** 1990 - 2003

**Flow Record:** Matched to flow duration for Salt C near Ada (06876700)

Figure 2

## Wilson Lake TMDL Reference Map

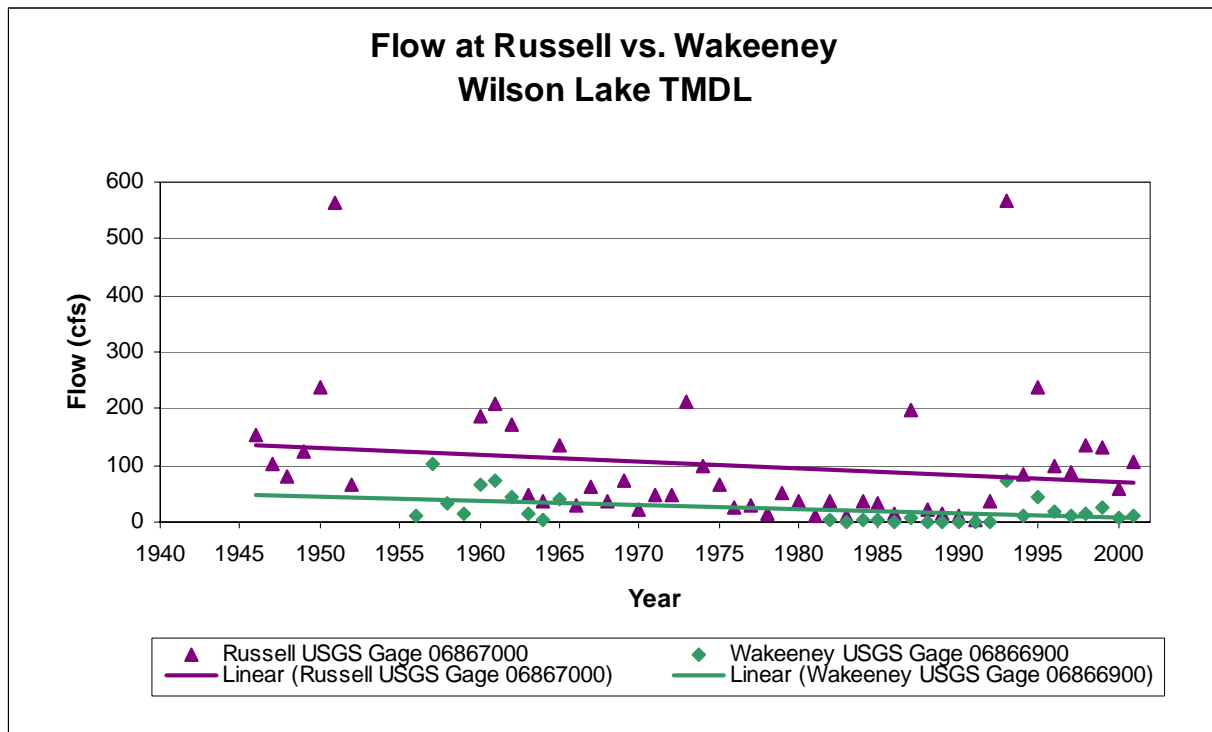


**Current Condition:** There is a relatively good relationship between flow within the drainage basin of the Saline River and the chloride content of Wilson Lake. Large fluctuations in the amount of rainfall that flows into Wilson Lake cause variations in the chloride concentrations. The runoff following a substantial rainstorm is appreciably fresher than most of the baseflow of streams and can dilute the chloride concentration of the lake and stream water (Figure 12). The flood of 1993 significantly increased the flow at the Saline River near Russell to an annual average flow of 566 cfs (Figure 3). The lake was replenished, and the salinity decreased. A low of 289 mg/L of chloride was seen in 1994. In drought years, the chloride concentration can reach up to 932 mg/L (Appendix A) in Wilson Lake.

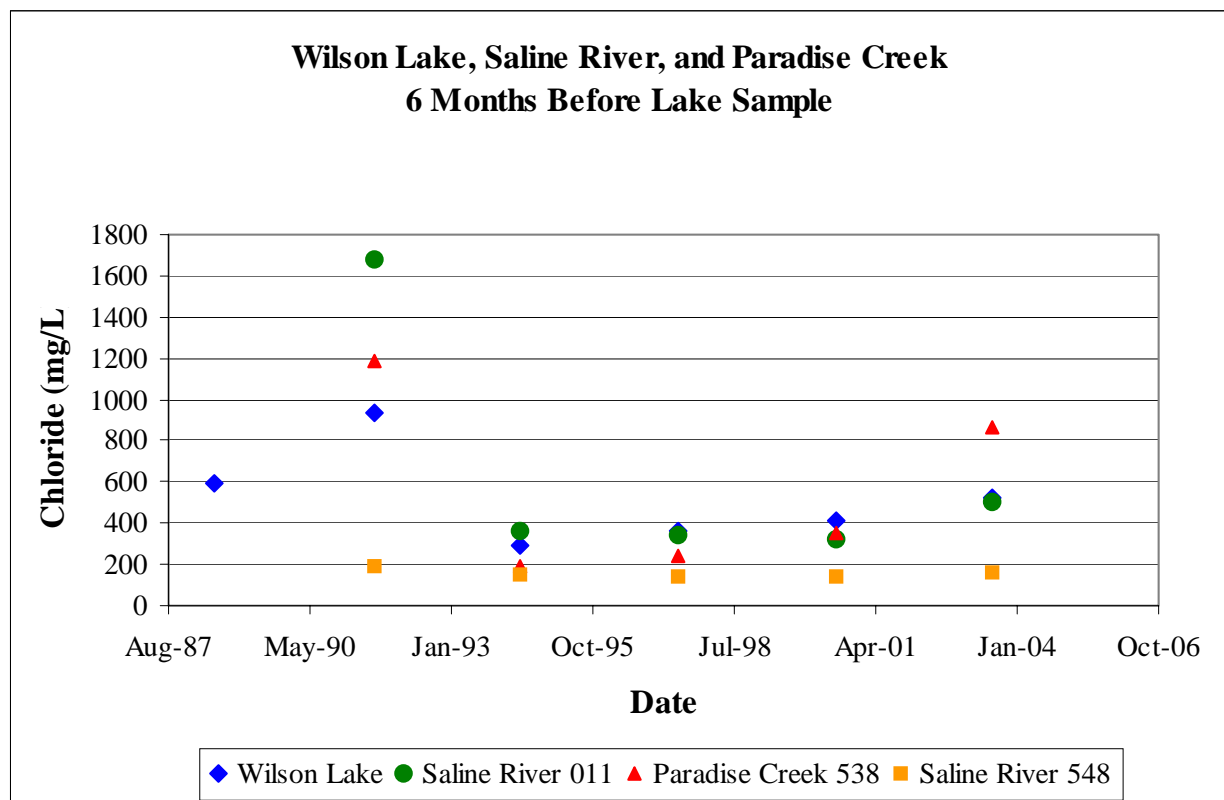
### Average Chloride Concentrations in Wilson Lake

Date	Chloride (mg/L)	Average Annual Flow at Saline Rv. Near Russell (cfs)
6/27/1988	590	22.2
8/13/1991	932	5.3
6/7/1994	289	85.4
6/24/1997	366	87.0
7/18/2000	412	60.3
7/21/2003	520	16.6

**Figure 3**

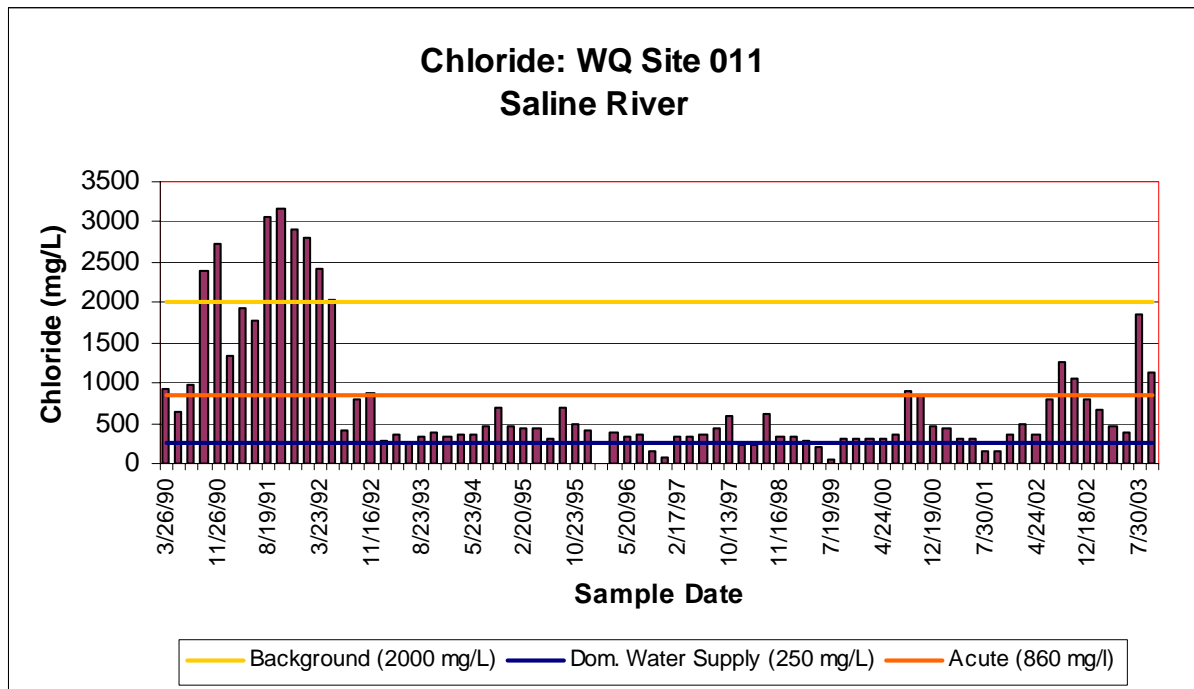


**Figure 4**



The chloride concentrations in Wilson Lake parallel the concentrations at the stream stations during the six months prior to sampling (Figure 4). The chloride levels at the upstream monitoring station 548, Saline River near Hays, are significantly lower than the levels at the Saline River near Russell (station 011) and Paradise Creek (station 538). The chloride concentration for the Saline River near Hays station is below the water quality standard, with a mean of 169 mg/L. Concentrations over the period of record for the two impaired stream stations can be seen in Figures 5 and 6. Figure 7 shows the compliant conditions near Hays. From 1990 to 2003, the mean chloride concentrations were 762 mg/L for the Saline River near Russell and 621 mg/L for Paradise Creek. While always elevated, there is a marked increase in chloride during low flow periods and drought. Near Hays, the mean concentration of chloride was 169 mg/l, and the current criterion of 250 mg/l will remain the endpoint at that location..

**Figure 5**



Since loading capacity varies as a function of the flow present in the stream, this TMDL represents a continuum of desired loads over all flow conditions, rather than fixed at a single value. Sample data for the sampling sites were categorized for each of the three defined seasons: Spring (Apr-Jul), Summer-Fall (Aug-Oct) and Winter (Nov-Mar). High flows and runoff equate to lower flow durations; baseflow and point source influences generally occur in the 75-99% range. A Load curve was established for the Domestic Water Supply criterion by multiplying the flow values along the curve by the applicable water quality criterion and converting the units to derive a load duration curve of tons of chloride per day. This load curves represent the TMDL since any point along the curve represents water quality for the standard at that flow. Historic excursions from the water quality standard are seen as plotted points above the load curve. Water quality standards are met for those points plotting below the load duration curve (Figures 8 & 9).

Figure 6

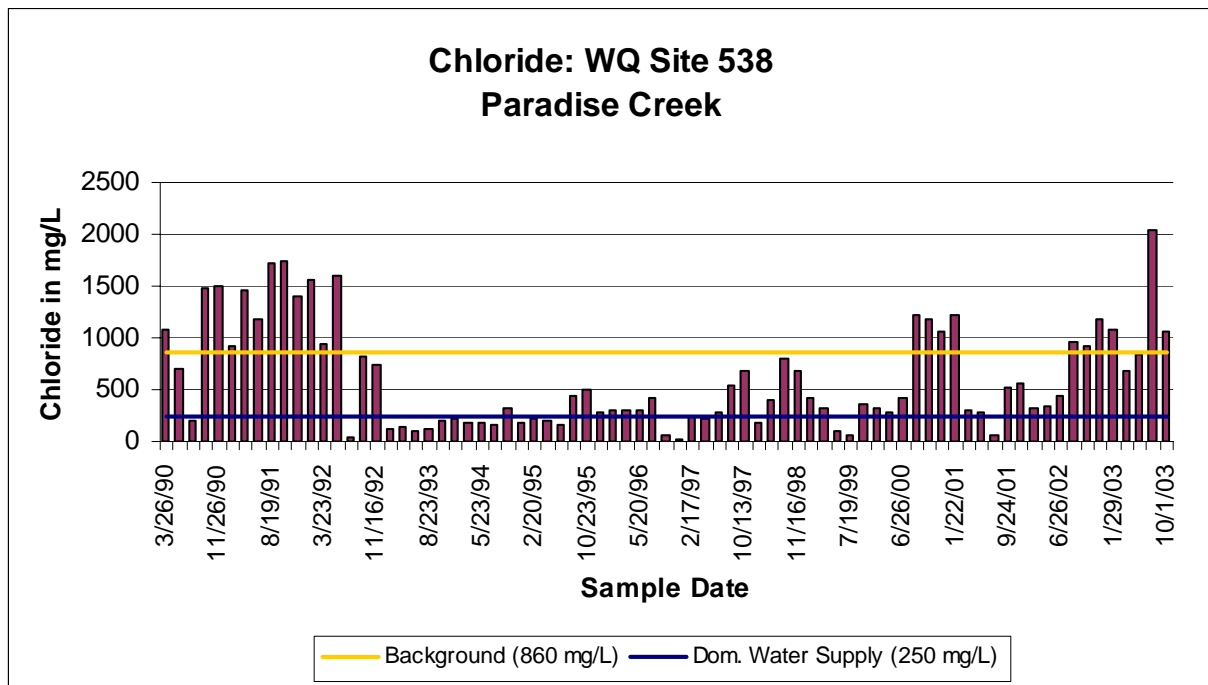


Figure 7

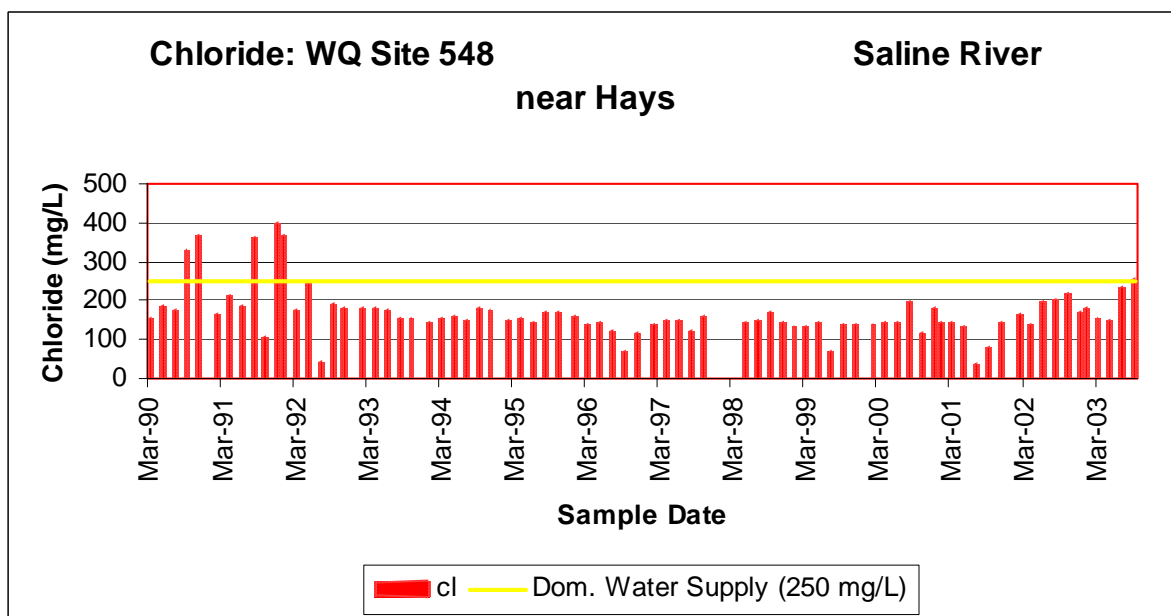


Figure 8

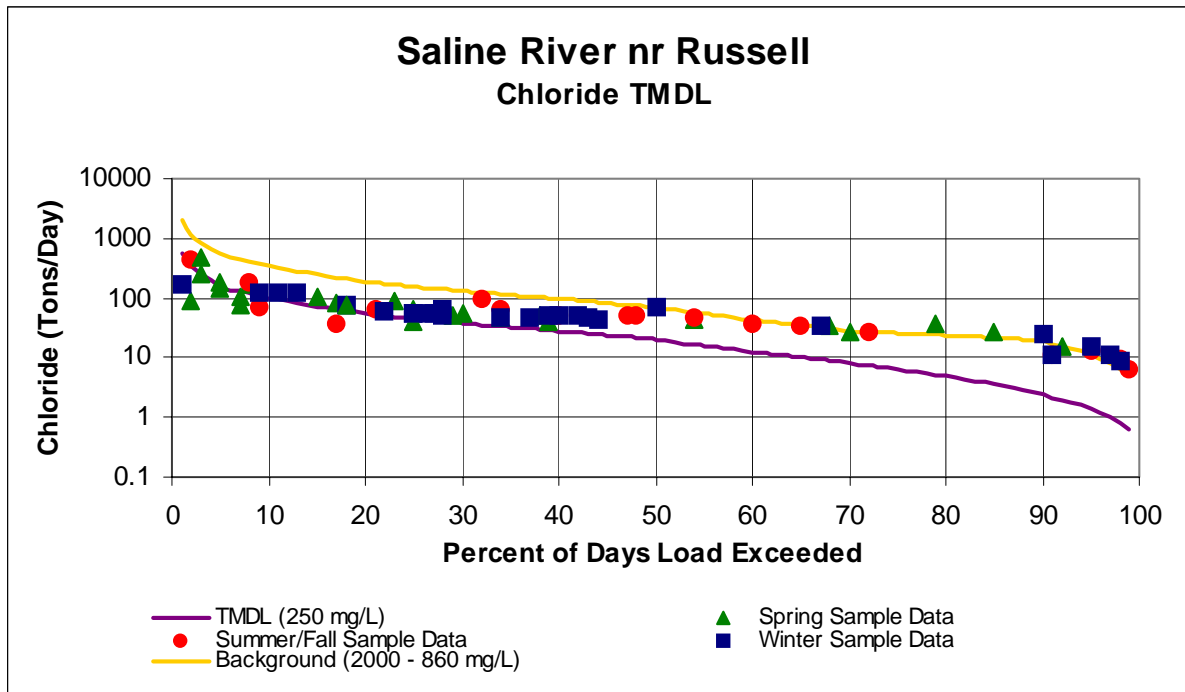


Figure 9

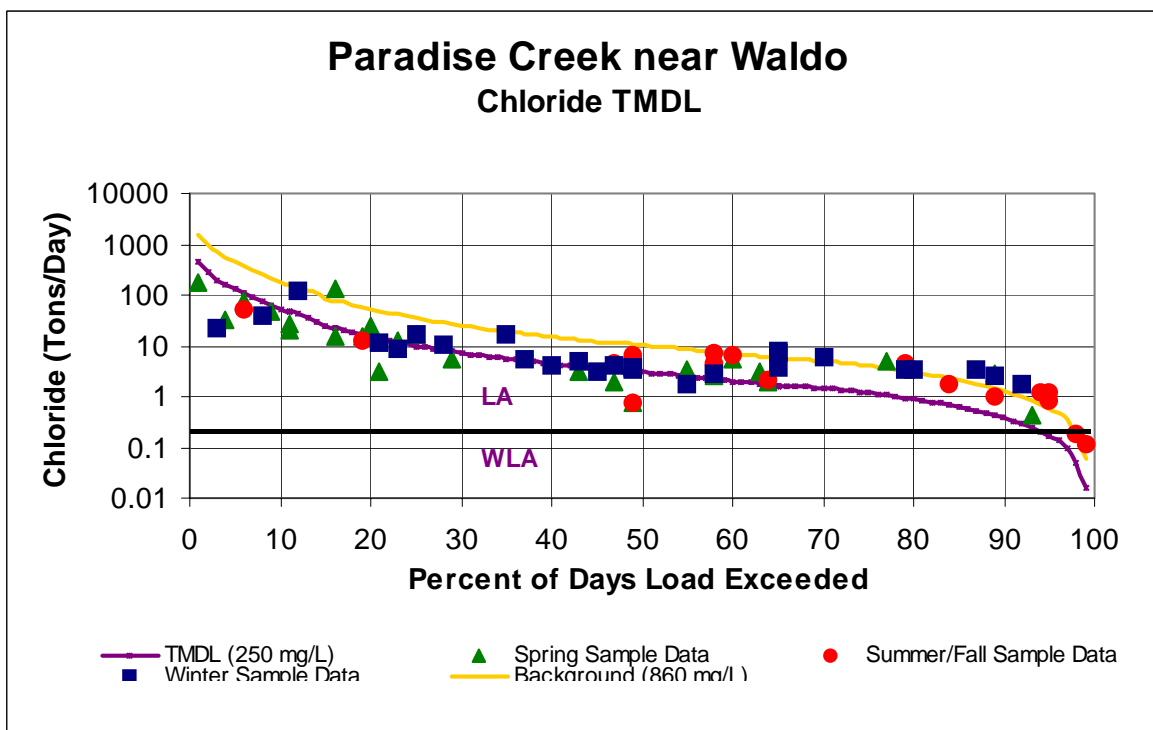




Figure 10

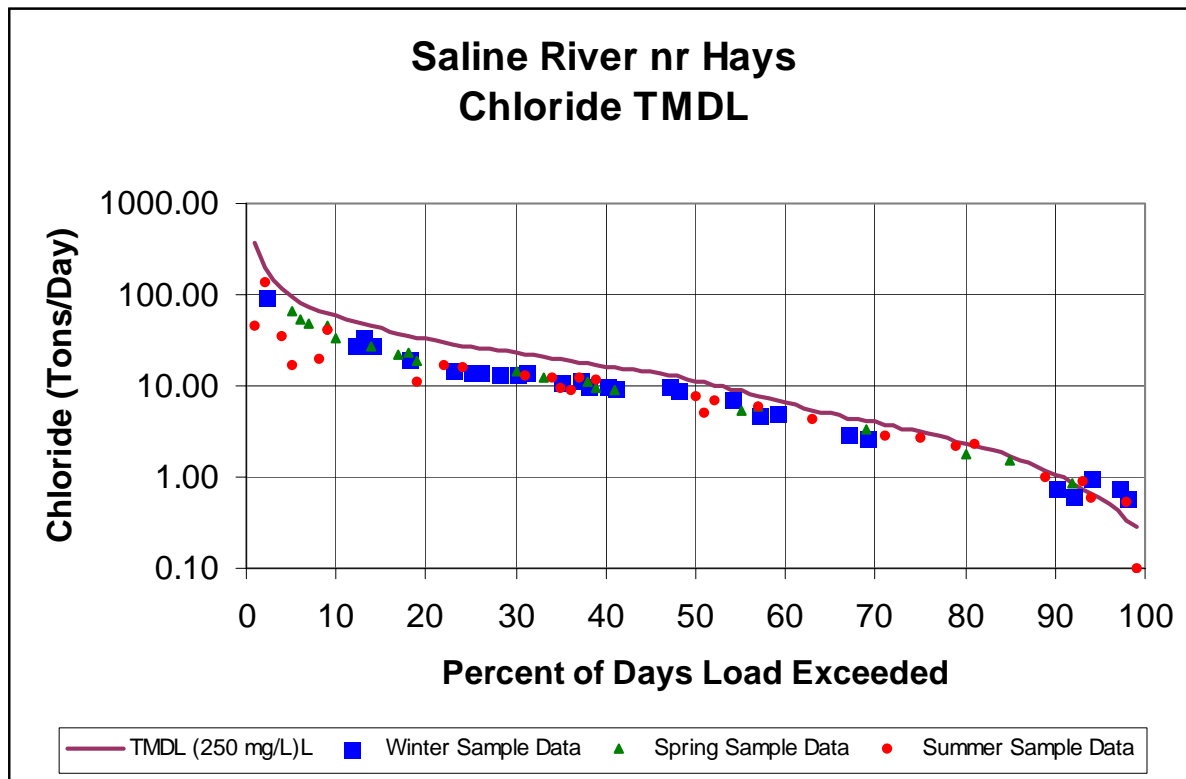


Figure 10 displays the conditions achieving the current TMDL endpoint of 250 mg/l on the Saline River near Hays. Some minor excursion is seen during low flow winter months.

Station 011: Excursions were seen in each of the three defined seasons and are outlined below. Seventy-five percent of Spring samples and 88% of Summer-Fall samples were over the domestic supply criterion. Ninety-six percent of Winter samples were over the criterion. Overall, 86% of the samples were over the criteria. This would represent a potential baseline condition of non-support of the impaired designated use, if a point of diversion for water supply was present along the river.

NUMBER OF SAMPLES OVER Chloride STANDARD OF 250 mg/L BY FLOW AND SEASON

Station	Season	0 to 10%	10 to 25%	25 to 50%	50 to 75%	75 to 90%	90 to 100%	Cum Freq.
Station 011 near Russell (Saline River)	Spring	3	5	4	3	2	1	18/24=75%
	Summer	2	1	4	4	0	3	14/16=88%
	Winter	1	5	12	1	1	4	24/25=96%

Station 538: Excursions were seen in each of the three defined seasons and are outlined below. Forty-eight percent of Spring samples and 83% of Summer-Fall samples were over the domestic supply criterion. Seventy-three percent of Winter samples were over the criterion. Overall, 67% of the samples were over the criteria. This would represent a potential baseline condition of non-support of the impaired designated use, if a point of diversion for water supply was present along the river.

NUMBER OF SAMPLES OVER Chloride STANDARD OF 250 mg/L BY FLOW AND SEASON

Station	Season	0 to 10%	10 to 25%	25 to 50%	50 to 75%	75 to 90%	90 to 100%	Cum Freq.
Station 538 near Waldo (Paradise Creek)	Spring	0	4	0	5	2	1	12/25=48%
	Summer	0	0	3	4	3	5	15/18=83%
	Winter	0	2	7	5	4	1	19/26=73%

### **Interim Endpoints of Water Quality (Implied Load Capacity) at Wilson Lake and Stations 011 and 538 over 2008 - 2012:**

Current Condition and Reductions for Wilson Lake

Parameter	Current Condition	TMDL/Background	Percent Reduction
Chloride (mg/L)	545	680	0 %

The ultimate endpoint for this TMDL will be to achieve the Kansas Water Quality Standards fully supporting Drinking Water Use. This TMDL will, however, be phased. The current standard of 250 mg/L of chloride was used to establish the TMDL. However, the discharge of saline ground water from the Dakota aquifer is the main source of the chloride in the surface water entering Wilson Lake. As such, the watershed's main stem in Russell County and many of its tributaries have elevated chloride levels from these natural sources. The natural background of chloride, consistently above 250 mg/L, makes achievement of the Standard unlikely for all flow conditions at Stations 011 and 538. Since the Standard is not achievable because of natural contributions to the chloride load, an alternative endpoint is needed for the Saline River and Paradise Creek in Russell County.

Kansas Implementation Procedures for Surface Water allow for a numerical criterion based on natural background to be established from samples taken at flows less than median in-stream flow. However, Figures 8 and 9 indicate chloride levels are elevated well above 250 mg/l at flows greater than the median flow, as well. Figure 5 indicates the need to have a dual endpoint for the Saline River, with one established for low flow, drought conditions and another for normal conditions. Under normal conditions, maintaining the chloride levels below the acute aquatic life criterion of 860 mg/l will be the primary objective for both impacted streams. A higher concentration will be allowed at drought flows to reflect the background levels historically seen. These specific stream criteria to supplant the current standard will be

developed concurrent with Phase One of this TMDL following the appropriate administrative and technical Water Quality Standards processes. The Phase Two TMDL will be based on the future standard applied to these flows within the contributing portions of the Saline River watershed to Stations 011 and 538. The Phase One endpoint of 250 mg/l will remain for the Saline River above the Ellis-Russell county line.

#### Tentative Endpoints for Stations 011 and 538

Station	Low Flow Background (mg/L)	Normal Flow Background (mg/l)
Station 011 near Russell (Saline River)	2000	860
Station 538 near Waldo (Paradise Creek)	860	860

Seasonal variation has been incorporated in this TMDL through the documentation of the seasonal consistency of elevated chloride levels. Achievement of the endpoints indicates that loads are within the loading capacity of the stream, water quality standards are attained and full support of the designated uses of the stream has been restored.

### 3. SOURCE INVENTORY AND ASSESSMENT

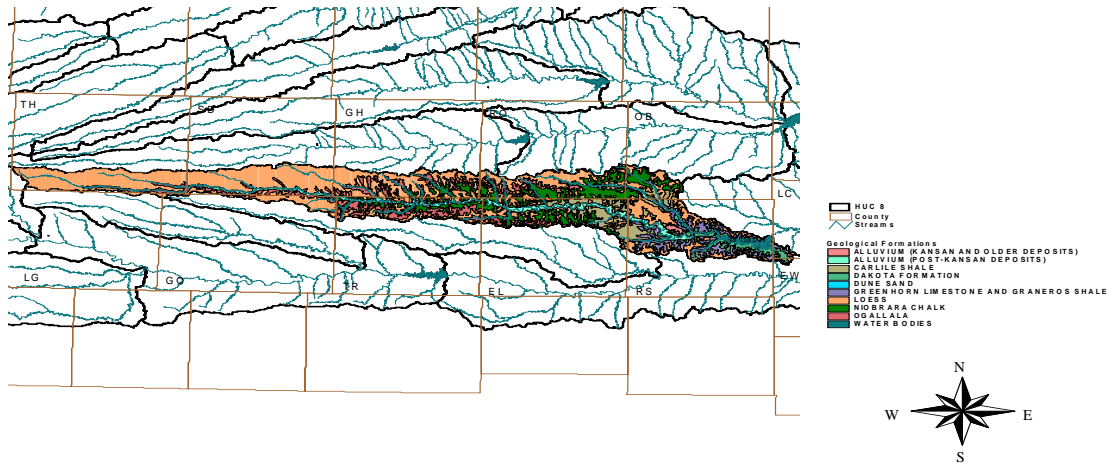
**Background Conditions:** The main source of chloride in Wilson Lake is the discharge of naturally saline groundwater from the Dakota aquifer into the alluvial aquifer of the Saline River and then into the river in Russell County. The saline groundwater originates from upward intrusion of saltwater from the Cedar Hills Sandstone of Permian age, that underlies the Dakota aquifer in parts of central and north-central Kansas (Figure 11). The chloride content of saltwater in the Cedar Hills Sandstone in Russell and Ellis counties averages about 26,000 mg/L based on available data. The saltwater is derived from the dissolution of halite (rock salt). Other natural sources are small amounts of chloride in the minerals and traces of seawater trapped in the marine bedrock of the drainage basin that are released during weathering of the rock. Evapotranspiration consumption of water in the drainage basin and evaporation from the surface of streams and the lake increase the chloride concentration of the surface water.

**Irrigation Return Flows:** Land use and water use are expected to have caused a small long-term increase in the chloride concentration (in comparison to conditions without these impacts) by increasing evapotranspiration consumption. Residual dissolved solids are left in a smaller volume of water because of reduced discharge of fresh groundwater and watertable levels from consumptive water use. Most of these land and water use changes are related to irrigation. However, the majority of irrigation occurs west of Wakeeney (Figure 12) and there has been no chloride impairments seen on the Saline River at Wakeeney nor near Hays. The chloride impairments begin at the Ellis-Russell county line. Notably, irrigation use drops off in Russell County, coinciding with the incidence of high chloride water which cannot be used for irrigation. Therefore, natural chloride intrusion into the ground and surface waters in the Saline River valley of Russell County are impacting irrigation, rather than the converse situation.

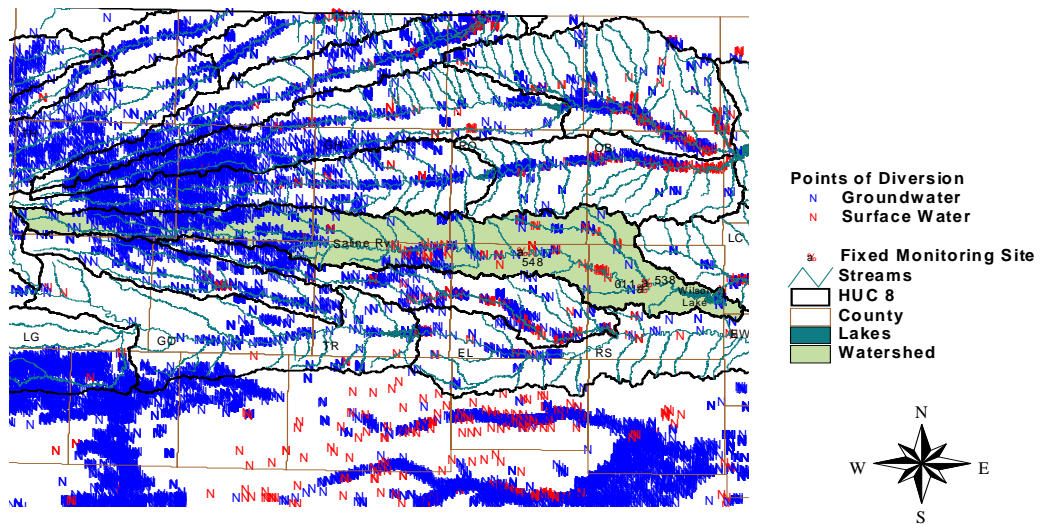
Figure 11

Figure 12

## Wilson Lake Geology



## Wilson Lake Points of Diversion



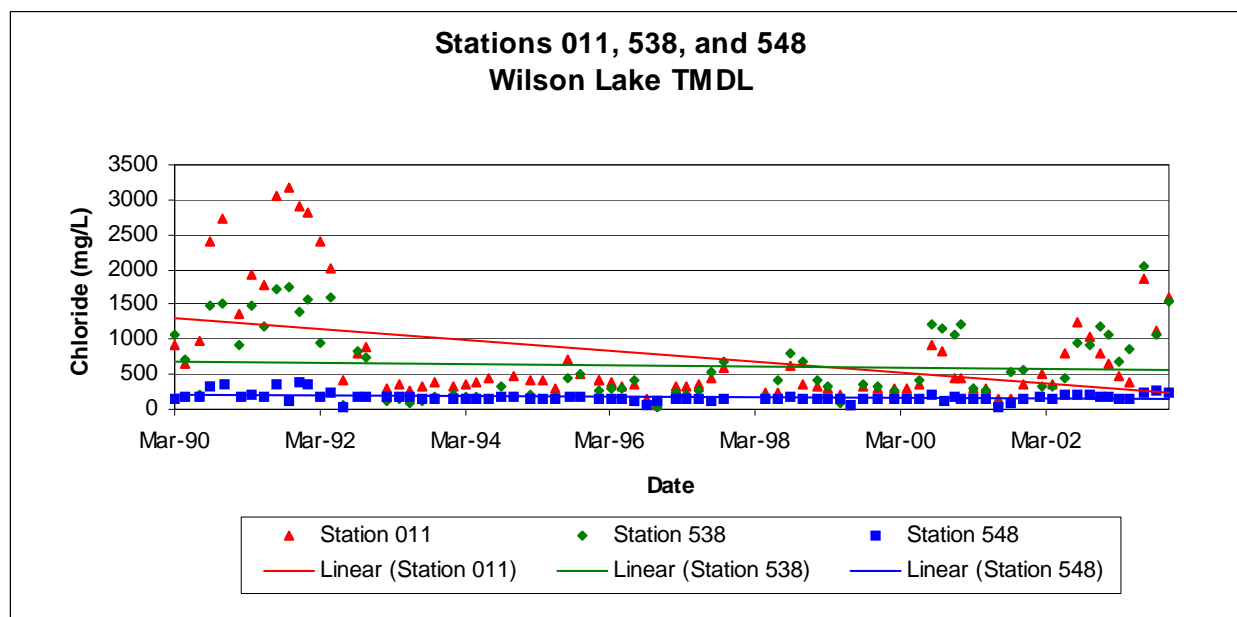
Irrigation reports from 2003 show the following:

#### Water Use Statistics for Each Monitoring Site

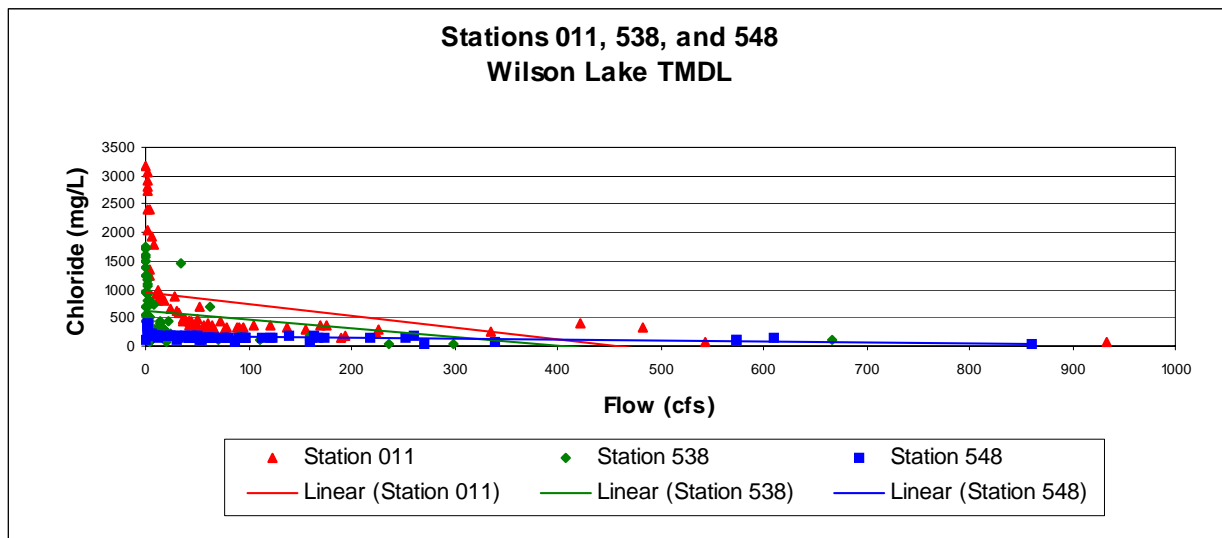
Monitoring Sites	Surface Water		Groundwater		1990-2003
	Area (acres)	Volume (acre-feet)	Area (acres)	Volume (acre-feet)	Chloride Conc. (mg/l)
Saline River Valley above Wakeeney (USGS est)	0	0	27,957	26,898	120
Station 548 near Hays up to Wakeeney (Saline R)	20	15	742	832	169
Station 011 near Russell (Saline River)	0	0	79	64	775
Station 538 near Waldo (Paradise Creek)	0	0	130	23	608

Chloride concentrations from Paradise Creek have remained consistent over time. Long-term chemical data of the Saline River near Russell shows that there is a small decrease in chloride content with time (Figure 13); this trend is not statistically significant and may be an artifact of fluctuations in flow. In general, the effects of anthropogenic sources and impacts on the chloride concentration of the river water are too small to be discernable in the presence of the natural factors. Climatic variations have a much greater effect on the short-term chloride concentration of the lake water than the long-term land and water use changes. The monitoring record for the watershed is insufficient to determine whether long-term climatic changes will have a greater impact on the chloride than land and water use changes. Any high flow events will dilute the chloride content (Figure 14).

**Figure 13**



**Figure 14**



**NPDES:** Thirteen permitted waste treatment facilities are located within the watershed (Figure 15). Ten are non-overflowing lagoons that are prohibited from discharging. Because of the low chloride content of the source water for discharging municipalities, their wastewater would be act as a dilution base for the background levels seen on the Saline River and Paradise Creek.

#### Waste Treatment Plants in the Wilson Lake Watershed

Kansas Permit Number	Name	Design Capacity (MGD)	Type	Average Chloride (mg/L)	Chloride WLA (tons/day)
C-SH29-NO02	CAMP INN TRAILER PARK	non-overflowing	4-cell Lagoon	0	0
C-SH29-NO04	JOHN JONES OIL CO. TRUCK STOP	non-overflowing	2-cell Lagoon	0	0
M-SA03-NO01	BUNKER HILL MWTP	non-overflowing	2-cell Lagoon	0	0
M-SA04-NO01	COLLYER MWTP	non-overflowing	3-cell Lagoon	0	0
M-SA10-OO01	NATOMA MWTP	0.054	3-cell Lagoon	130	0.03
M-SA12-NO01	PARADISE MWTP	non-overflowing	2-cell Lagoon	0	0
M-SA13-NO01	PARK MWTP	non-overflowing	4-cell Lagoon	0	0
M-SA14-OO02	PLAINVILLE MWTP (NEW)	0.225	4-cell Lagoon	182	0.19
M-SA15-OO01	QUINTER MWTP	0.107	3-cell Lagoon	100	0.04
M-SA19-NO01	ZURICH MWTP	non-overflowing	3-cell Lagoon	0	0
M-SH12-NO01	GRAINFIELD MWTP	non-overflowing	3-cell Lagoon	0	0
M-SH05-NO03	KDWP - WILSON PARK	non-overflowing	2-cell Lagoon	0	0
M-SH05-NO02	KDWP - WILSON LAKE	non-overflowing	2-cell Lagoon	0	0

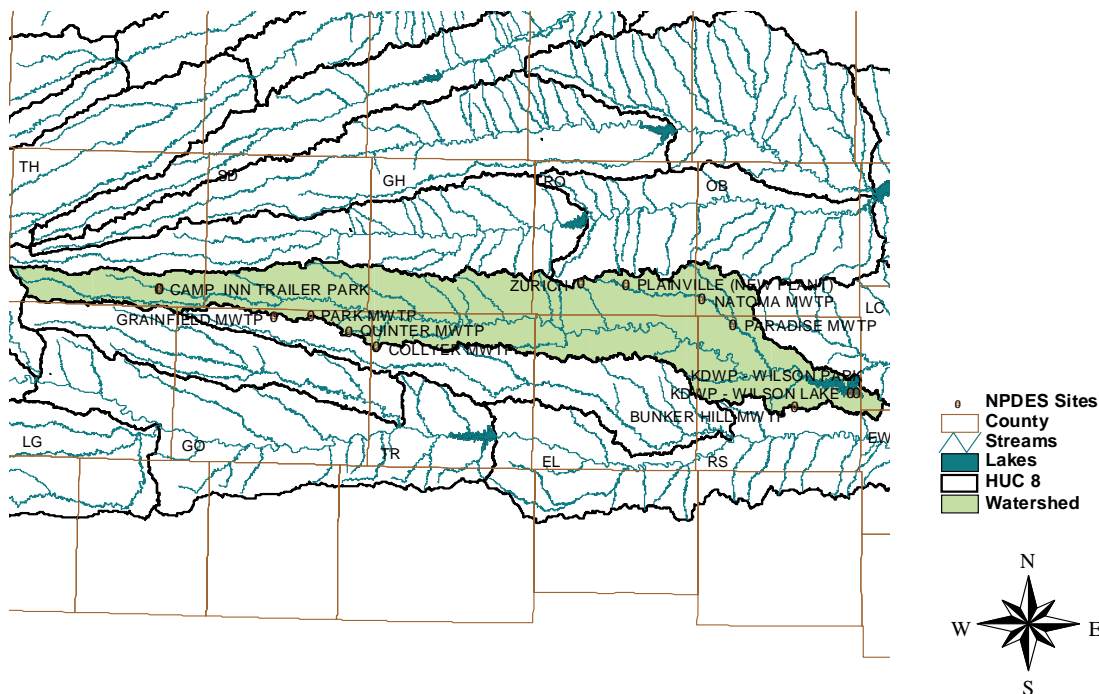
Since none of the municipal NPDES sites in the watershed are currently required to monitor for chloride in their effluent, average chloride concentrations for municipal sources were estimated

based on the chloride of their source water. Wasteload allocations were set at concentrations of 100, 150 and 200 mg/l for Quinter, Natoma and Plainville, respectively.

**Figure 15**

**Oilfield Brine:** There are substantial oil fields that lie within the Saline River drainage basin. However, an evaluation of the chemistry (bromide/chloride ratios versus chloride concentration) of

## Wilson Lake NPDES Sites



Wilson Lake, Saline River, and Paradise Creek waters indicates that the load of chloride derived from past oil-brine disposal is very small in comparison with that from natural sources.

**Other Factors:** Discharge of water containing dissolved rock salt used for water softeners and for road de-icing are minor contributing factors.

**Contributing Runoff:** The watershed's average soil permeability is 1.4 inches/hour according to NRCS STATSGO database. About 82.1% of the watershed produces runoff even under relatively low (1.5"/hr) potential runoff conditions. Runoff is chiefly generated as infiltration excess with rainfall intensities greater than soil permeabilities. As the watersheds' soil profiles become saturated, excess overland flow is produced. Generally, storms producing less than 0.5"/hr of rain will generate runoff from 5.4% of this watershed, chiefly along the stream channels.

#### 4. ALLOCATION OF POLLUTANT REDUCTION RESPONSIBILITY

The source assessment has ascertained that natural chloride loading within the watershed is the primary factor for the excursions seen at the monitoring stations within the Wilson Lake basin.

**Point and Nonpoint Sources:** In the table below, under Phase One, the Wasteload and Load Allocations are given for all the stations included in this TMDL. The total Wasteload Allocation entering Wilson Lake is 0.24 tons per day. Under Phase Two, Load Allocations were calculated from the applicable background concentrations designated in the endpoint. Since chloride levels differ between low and normal flows, dual background concentrations were used at Russell.

Wasteload and Load Allocations (tons per day) of Chloride in Wilson Lake Watershed

Chloride TMDL			
	SC548	SC011	SC538
Low Flow (90% excd) - cfs	1.6	3.6	0.6
Median Flow (50% excd) - cfs	16.7	29.2	4.4
Wasteload Allocations	0.04	0.00*	0.22
Phase One Load Allocation - Low	0.97	2.19 **	0.36
Phase One Margin of Safety - Low	0.11	0.24 ***	0.04
Phase One TMDL - Low	1.12	2.43	0.62
Phase One Load Allocation - Normal	10.15	17.74	2.67
Phase One Margin of Safety - Normal	1.13	1.97	0.30
Phase One TMDL - Normal	11.32	19.71	3.19
Phase Two Load Allocation - Low	same as above	17.50	1.25
Phase Two Margin of Safety - Low	same as above	1.94	0.14
Phase Two TMDL - Low	same as above	19.44	1.61
Phase Two Load Allocation - Normal	same as above	61.02	9.20
Phase Two Margin of Safety - Normal	same as above	6.78	1.02
Phase Two TMDL - Normal	same as above	67.80	10.44
Phase Two Concentrations	250 mg/l	2000/860 mg/l*****	860 mg/l

\* represents point sources between Stations 548 & 011

\*\* cumulative load allocation from entire upstream watershed

\*\*\* margin of safety is an explicit 10% off the load allocation

\*\*\*\*\* 2000 mg/l at low flows; 860 mg/l at normal flows

**Defined Margin of Safety:** Since the majority of contribution of chloride to the Saline River derives from natural mineralized ground water intrusion, the Margin of Safety is explicitly 10% of calculated Load Allocations using either the original water quality criterion or the proposed background concentrations. Additionally, a Margin of Safety is applied to the Wasteload Allocations by their calculations based on chloride concentrations in the discharger's effluent below 250 mg/l (range 100-200 mg/l). Both of these calculations ensure that resulting loadings will cause the chloride content in the Saline River and Paradise Creek to remain below the intended endpoints.



**State Water Plan Implementation Priority:** Because the impairment is due to natural geologic sources, this TMDL will be a Low Priority for implementation.

**Unified Watershed Assessment Priority Ranking:** Wilson Lake lies within the Upper Saline (HUC 8: 10260009) with a priority ranking of 39 (Medium Priority for restoration).

**Priority HUC 11s:** Because of the natural geologic contribution of this impairment, no priority subwatersheds or stream segments will be identified.

## **5. IMPLEMENTATION**

### **Desired Implementation Activities**

1. Monitor any anthropogenic contributions of chloride loading to the lake and streams.
2. Establish an alternative background criterion.
3. Assess likelihood of the lake being used for water supply and impact of elevated chloride on that designated use.

### **Implementation Programs Guidance**

#### **NPDES and State Permits - KDHE**

- a. Municipal permits for facilities in the watershed will be renewed after 2004 with annual chloride monitoring and any excessive chloride discharge will have appropriate permit limits which do not increase the ambient background levels of chloride.

#### **Non-Point Source Pollution Technical Assistance - KDHE**

- a. Evaluate any potential anthropogenic activities which might contribute chloride to the lake as part of an overall Watershed Restoration and Protection Strategy.

#### **Water Quality Standards and Assessment - KDHE**

- a. Establish background concentrations of chloride for the lake, river, and tributaries.

#### **Use Attainability Analysis - KDHE**

- a. Consult with Division of Water Resources and Kansas Water Office on locating existing or future water supply points of diversion from Wilson Lake for drinking water usage.

**Time Frame for Implementation:** Development of a background level-based water quality standard should be accomplished with the next water quality standards revision.

**Targeted Participants:** Primary participants for implementation will be KDHE, KWO and DWR.

**Milestone for 2008:** The year 2008 marks the midpoint of the ten-year implementation window for the watershed. At that point in time, additional monitoring data from Wilson Lake will be reexamined to confirm the impaired status of the lake and the suggested background concentration. Should the case of impairment remain, source assessment, allocation and implementation activities will ensue.

**Delivery Agents:** The primary delivery agents for program participation will be the Kansas Department of Health and Environment, the Kansas Water Office and the Kansas Department of Agriculture, Division of Water Resources.

**Reasonable Assurances:**

**Authorities:** The following authorities may be used to direct activities in the watershed to reduce pollutants.

1. K.S.A. 65-171d empowers the Secretary of KDHE to prevent water pollution and to protect the beneficial uses of the waters of the state through required treatment of sewage and established water quality standards and to require permits by persons having a potential to discharge pollutants into the waters of the state.
2. K.S.A. 2-1915 empowers the State Conservation Commission to develop programs to assist the protection, conservation and management of soil and water resources in the state, including riparian areas.
3. K.S.A. 75-5657 empowers the State Conservation Commission to provide financial assistance for local project work plans developed to control nonpoint source pollution.
4. K.S.A. 82a-901, et seq. empowers the Kansas Water Office to develop a state water plan directing the protection and maintenance of surface water quality for the waters of the state.
5. K.S.A. 82a-951 creates the State Water Plan Fund to finance the implementation of the *Kansas Water Plan*.
6. The *Kansas Water Plan* and the Smoky Hill/Saline Basin Plan provide the guidance to state agencies to coordinate programs intent on protecting water quality and to target those programs to geographic areas of the state for high priority in implementation.

**Funding:** The State Water Plan Fund annually generates \$16-18 million and is the primary funding mechanism for implementing water quality protection and pollutant reduction activities in the state through the *Kansas Water Plan*. The state water planning process, overseen by the Kansas Water Office, coordinates and directs programs and funding toward watersheds and water resources of highest priority. Typically, the state allocates at least 50% of the fund to programs supporting water quality protection. This watershed and its TMDL are a Low Priority consideration and should not receive funding.

**Effectiveness:** Minimal control can be exerted on natural contributions to loading.

## **6. MONITORING**

KDHE will continue to collect samples from Wilson Lake and at Stations 011 and 538. Based on that sampling, the priority status will be evaluated in 2008 including application of a numeric criterion based on background concentrations. Should impaired status remain, the desired endpoints under this TMDL will be refined and direct more intensive sampling will need to be conducted under specified seasonal flow conditions over the period 2008-2012.

Monitoring of chloride levels in effluent will be a condition of NPDES and state permits for facilities. This monitoring will continually assess the functionality of the systems in reducing chloride levels in the effluent released to the streams upstream of Wilson Lake.

## **7. FEEDBACK**

**Public Meetings:** Public meetings to discuss TMDLs in the Smoky Hill/Saline Basin were held January 7 and March 5, 2003 in Hays. An active Internet Web site was established at <http://www.kdhe.state.ks.us/tmdl/> to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Smoky Hill/Saline Basin.

**Public Hearing:** A Public Hearing on the TMDLs of the Smoky Hill/Saline Basin was held in Hays on June 2, 2003.

**Basin Advisory Committee:** The Smoky Hill/Saline Basin Advisory Committee met to discuss the TMDLs in the basin on October 3, 2002, January 7, March 5, and June 2, 2003.

**Milestone Evaluation:** In 2008, evaluation will be made as to the degree of implementation which has occurred within the watershed and current condition of Wilson Lake. Subsequent decisions will be made regarding the implementation approach and follow up of additional implementation in the watershed.

**Consideration for 303(d) Delisting:** The lake will be evaluated for delisting under Section 303(d), based on the monitoring data over the period 2008-2012. Therefore, the decision for delisting will come about in the preparation of the 2012 303(d) list. Should modifications be made to the applicable water quality criteria during the ten-year implementation period, consideration for delisting, desired endpoints of this TMDL and implementation activities may be adjusted accordingly.

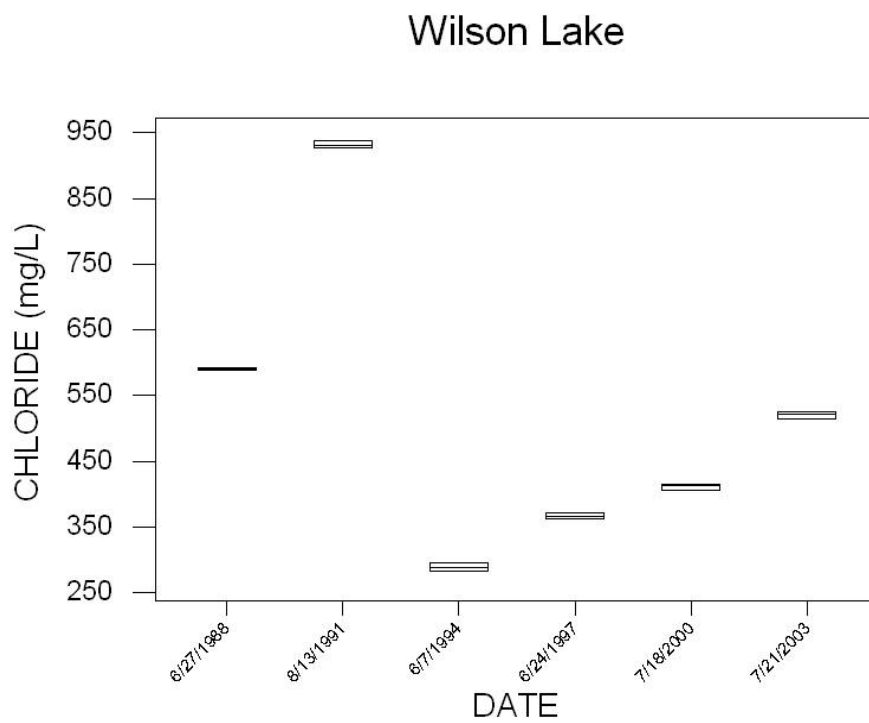
**Incorporation into Continuing Planning Process, Water Quality Management Plan and the Kansas Water Planning Process:** Under the current version of the Continuing Planning Process, the next anticipated revision will come in 2004 which will emphasize revision of the Water Quality Management Plan. At that time, incorporation of this TMDL will be made into both documents. Recommendations of this TMDL will be considered in *Kansas Water Plan* implementation decisions under the State Water Planning Process for Fiscal Years 2004-2008.

## **Bibliography**

Liscek, Bonnie C. Methodology Used in Kansas Lake TMDLs [web page] Jul. 2001;  
<http://www.kdhe.state.ks.us/tmdl/eutro.htm> [Accessed 30 September 2002].

Whittemore, D. (1 Jul 2003). Wilson Lake/Saline River Cl & SO<sub>4</sub> TMDLs

## Appendix A - Boxplots



9/15/04

